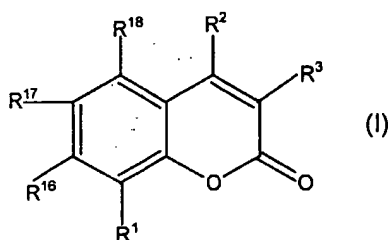


Claims

1. Radiation-sensitive element comprising

- (a) an aluminum substrate which has been subjected to a pretreatment of electrochemical roughening and optionally subsequent anodizing and/or application of a hydrophilizing layer, wherein the electrochemical roughening is carried out with a hydrochloric acid electrolyte or an electrolyte essentially consisting of hydrochloric acid, and
- (b) a radiation-sensitive coating comprising
 - (i) at least one free-radical polymerizable monomer with at least one ethylenically unsaturated polymerizable group and at least one P-OH group,
 - (ii) at least one sensitizer of the formula (I),



wherein

R^1 , R^{16} , R^{17} and R^{18} are independently selected from -H, a halogen atom, C_1 - C_{20} alkyl, -OH, -O- R^4 and - NR^5R^6 , wherein R^4 is C_1 - C_{20} alkyl, C_5 - C_{10} aryl or C_6 - C_{30} aralkyl and R^5 and R^6 are independently selected from a hydrogen atom and C_1 - C_{20} alkyl,

or R^1 and R^{16} , R^{16} and R^{17} or R^{17} and R^{18} together form a 5- or 6-membered heterocyclic ring with a heteroatom selected from N and O in one or both positions adjacent to the phenyl ring,

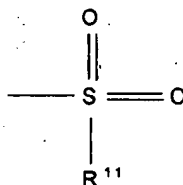
or R^{16} or R^{17} forms, together with each of its two adjacent substituents, a 5- or 6-membered heterocyclic ring with a heteroatom selected from N and O in one or both positions adjacent to the phenyl ring;

wherein each formed 5- or 6-membered heterocyclic ring can independently be substituted with one or more C_1 - C_6 alkyl groups,

with the proviso that at least one of R^1 , R^{16} , R^{17} and R^{18} is not hydrogen or C_1 - C_{20} alkyl,

R^2 is a hydrogen atom, C_1 - C_{20} alkyl, C_5 - C_{10} aryl or C_6 - C_{30} aralkyl and

R^3 is a hydrogen atom or a substituent selected from $-\text{COOH}$, $-\text{COOR}^7$, $-\text{COR}^8$, $-\text{CONR}^9\text{R}^{10}$, $-\text{CN}$, C_5 - C_{10} aryl, C_6 - C_{30} aralkyl, a 5- or 6-membered heterocyclic group, a group $-\text{CH}=\text{CH}-\text{R}^{12}$ and

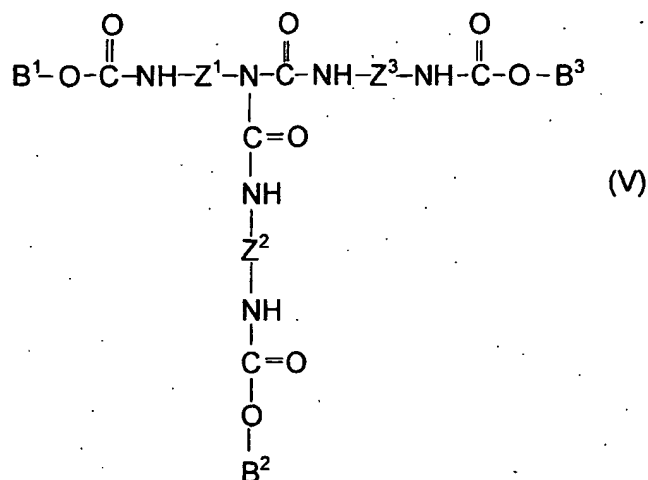


wherein R^7 is C_1 - C_{20} alkyl, R^8 is C_1 - C_{20} alkyl or a 5- or 6-membered heterocyclic group, R^9 and R^{10} are independently selected from a hydrogen atom and C_1 - C_{20} alkyl, R^{11} is C_1 - C_{12} alkyl or alkenyl, a heterocyclic non-aromatic ring or C_5 - C_{20} aryl optionally with a heteroatom selected from O, S and N, and R^{12} is C_5 - C_{10} aryl or a 5- or 6-membered heterocyclic, optionally aromatic, ring;

or R^2 and R^3 , together with the carbon atoms to which they are bonded, form a 5- or 6-membered, optionally aromatic, ring;

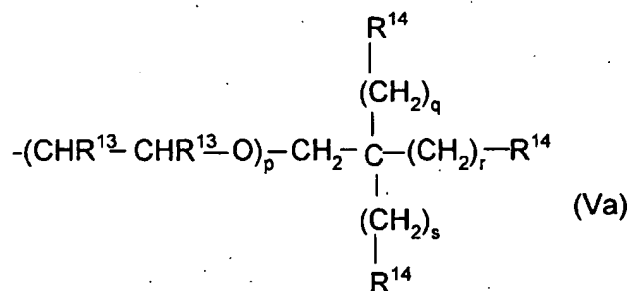
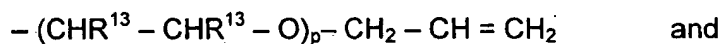
- (iii) at least one coinitiator selected from an onium compound, a hexaarylbiimidazole compound and a trihalogenomethyl compound;

(iv) at least one biuret oligomer of the formula (V)



wherein Z^1 , Z^2 and Z^3 are independently selected from C_2 - C_{18} alkanediyl and C_6 - C_{20} arylene,

B^1 , B^2 and B^3 are independently selected from



wherein R^{13} is independently selected from a hydrogen atom and $-\text{CH}_3$ and $p = 0$ or an integer from 1-10, each group R^{14} is independently selected from a hydrogen atom, a group



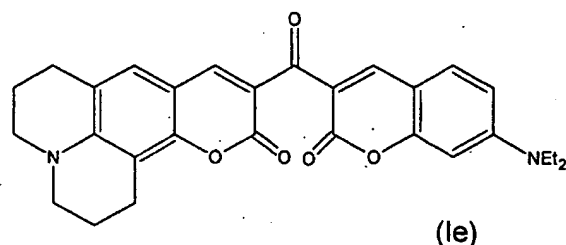
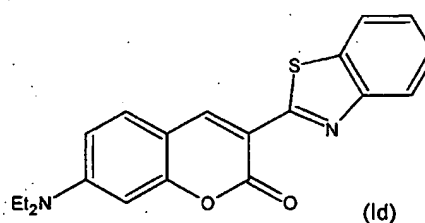
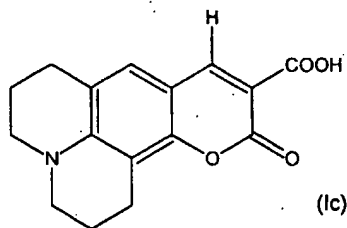
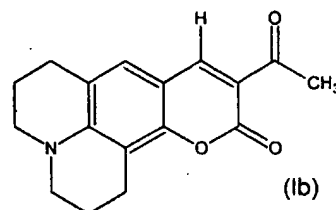
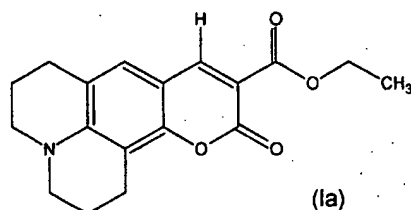
R^{15} is a hydrogen atom or C_1 - C_{12} alkyl and

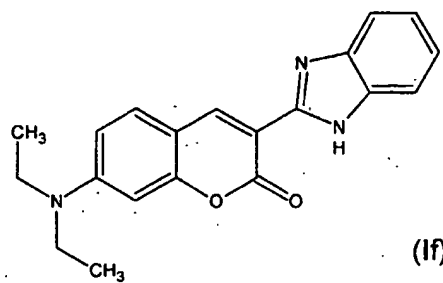
q , r and s independently of each other are 0 or 1,

with the proviso that in each group B^1 , B^2 and B^3 at least one R^{14} is not a hydrogen atom if B^1 , B^2 and B^3 all represent a group of the formula (Va), and

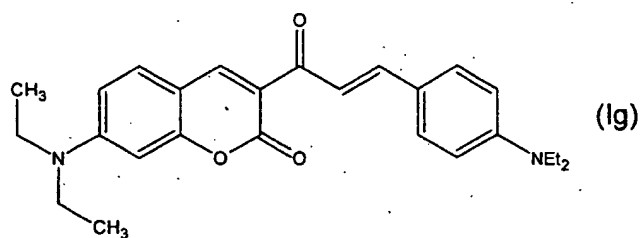
(v) optionally at least one metallocene.

2. Radiation-sensitive element according to claim 1, wherein the radiation-sensitive coating additionally comprises at least one further component selected from free-radical polymerizable monomers/oligomers/prepolymers that are different from component (i) of the radiation-sensitive coating, alkali-soluble binders, thermopolymerization inhibitors, dyes, plasticizers, chain transfer agents, leuco dyes, inorganic fillers and surfactants.
3. Radiation-sensitive element according to claim 1 or 2, wherein the sensitizer of the formula (I) is selected from the following compounds and mixtures thereof:

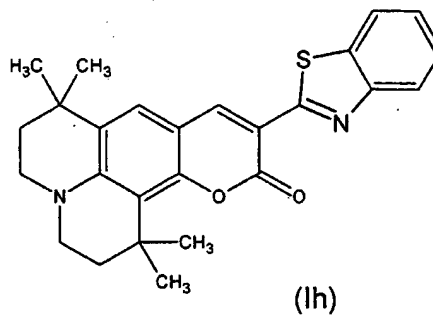




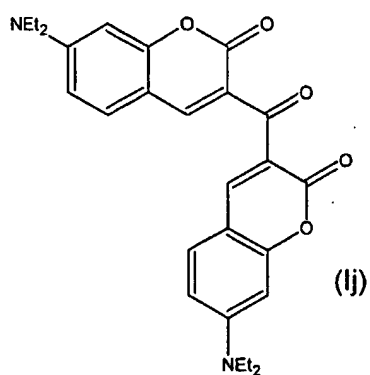
(If)



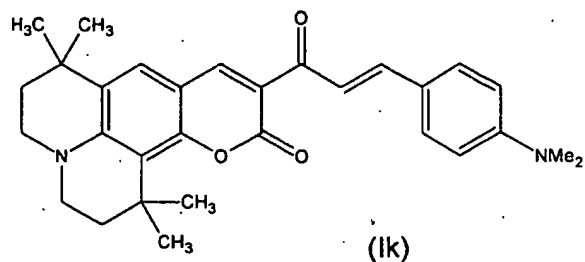
(Ig)



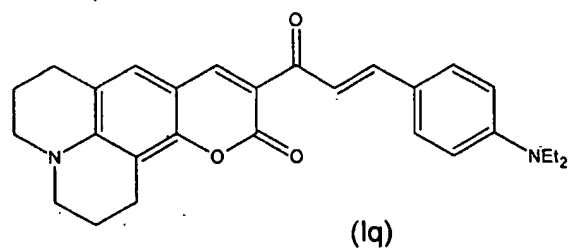
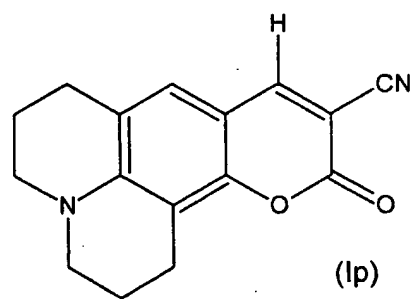
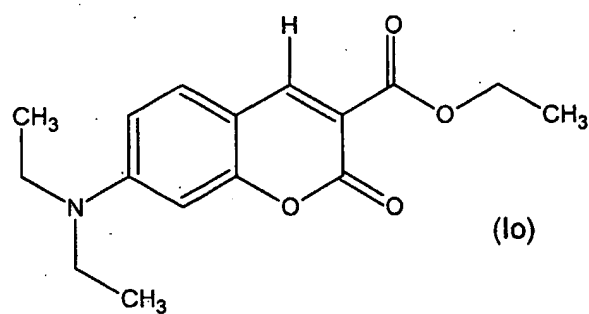
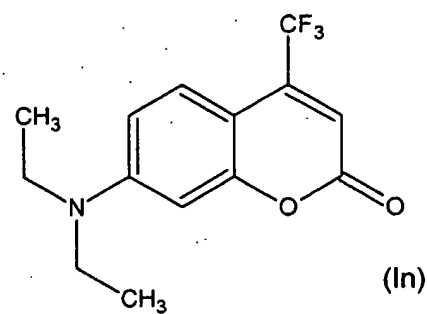
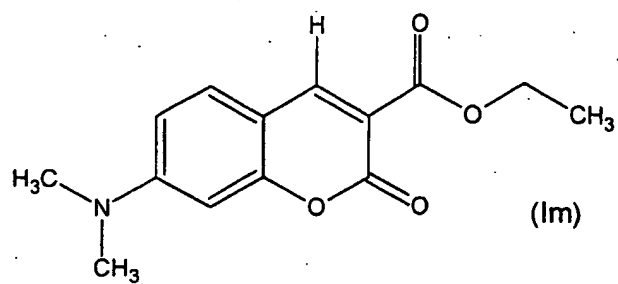
(Ih)



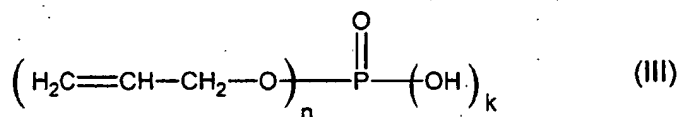
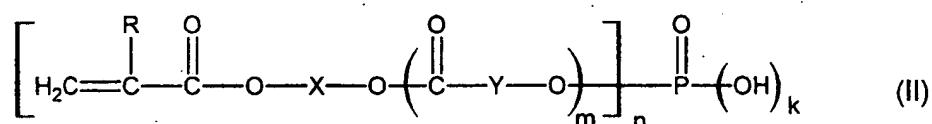
(Ij)



(Ik)



4. Radiation-sensitive element according any of claims 1 to 3, wherein the coinitiator is an iodonium salt or a hexaarylbiimidazole compound.
5. Radiation-sensitive element according to any of claims 1 to 4, wherein the radiation-sensitive coating comprises a metallocene with a metal of the fourth subgroup as a central atom.
6. Radiation-sensitive element according to any of claims 1 to 5, wherein the free-radical polymerizable monomer with at least one ethylenically unsaturated group and at least one P-OH group is represented by the following formula (II) or (III):



wherein n is 1 or 2,

m is 0 or 1,

k is 1 or 2,

n + k = 3,

R is a hydrogen atom or C₁-C₁₂ alkyl,

X is C₂-C₁₂ alkanediyl and

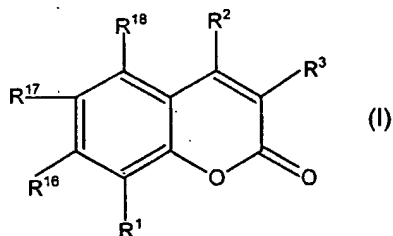
Y is C₂-C₁₂ alkanediyl.

7. Radiation-sensitive element according to any of claims 1 to 6, wherein in the biuret of formula (V) Z¹ = Z² = Z³.
8. Radiation-sensitive element according to any of claims 1 to 7, wherein an oxygen-impermeable overcoat is provided on the radiation-sensitive coating.
9. Process for the production of an imaged element comprising

- (a) providing a radiation-sensitive element as defined in any of claims 1 to 8;
- (b) image-wise exposure of the element with radiation of a wavelength adjusted to the sensitizer present in the radiation-sensitive layer of the element;
- (c) optionally heating;
- (d) removing the unexposed areas with an aqueous alkaline developer; and
- (e) optionally heating the imaged element obtained in step (d) and/or subjecting it to overall exposure.

10. Radiation-sensitive composition comprising

- (i) at least one free-radical polymerizable monomer with at least one ethylenically unsaturated polymerizable group and at least one P-OH group,
- (ii) at least one sensitizer of the formula (I)



wherein

R^1 , R^{16} , R^{17} and R^{18} are independently selected from -H, a halogen atom, C_1 - C_{20} alkyl, -OH, -O- R^4 and -NR⁵R⁶, wherein R^4 is C_1 - C_{20} alkyl, C_5 - C_{10} aryl or C_6 - C_{30} aralkyl and R^5 and R^6 are independently selected from a hydrogen atom and C_1 - C_{20} alkyl,

or R^1 and R^{16} , R^{16} and R^{17} or R^{17} and R^{18} together form a 5- or 6-membered heterocyclic ring with a heteroatom, selected from N and O, in one or both positions adjacent to the phenyl ring,

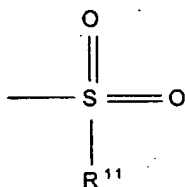
or R^{16} or R^{17} forms, together with each of its two adjacent substituents, a 5- or 6-membered heterocyclic ring with a heteroatom, selected from N and O, in one or both positions adjacent to the phenyl ring,

wherein each formed 5- or 6-membered heterocyclic ring can independently be substituted with one or more C₁-C₆ alkyl groups,

with the proviso that at least one of R¹, R¹⁶, R¹⁷ and R¹⁸ is not hydrogen or C₁-C₂₀ alkyl;

R² is a hydrogen atom, C₁-C₂₀ alkyl, C₅-C₁₀ aryl or C₆-C₃₀ aralkyl and

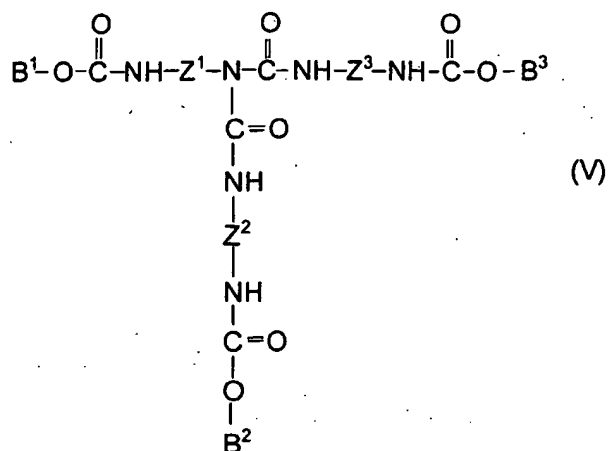
R³ is hydrogen atom or a substituent selected from -COOH, -COOR⁷, -COR⁸, -CONR⁹R¹⁰, -CN, C₅-C₁₀ aralkyl, a 5- or 6-membered heterocyclic group, a group -CH=CH-R¹² and



wherein R⁷ is C₁-C₂₀ alkyl, R⁸ is C₁-C₂₀ alkyl or a 5- or 6-membered heterocyclic group, R⁹ and R¹⁰ are independently selected from a hydrogen atom and C₁-C₂₀ alkyl, R¹¹ is C₁-C₁₂ alkyl or alkenyl, a heterocyclic non-aromatic ring or C₅-C₂₀ aryl optionally with a heteroatom selected from O, S and N, and R¹² is C₅-C₁₀ aryl or a 5- or 6-membered heterocyclic, optionally aromatic, ring;

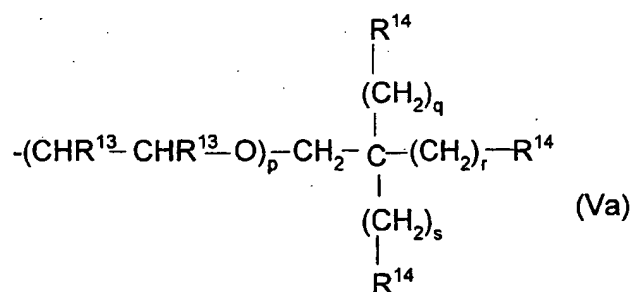
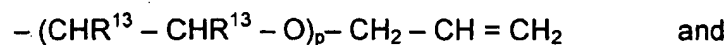
or R² and R³, together with the carbon atoms to which they are bonded, form a 5- or 6-membered, optionally aromatic, ring;

- (iii) at least one coinitiator selected from an onium compound, a hexaarylbiimidazole compound and a trihalogenomethyl compound;
- (iv) at least one biuret oligomer of the formula (V)

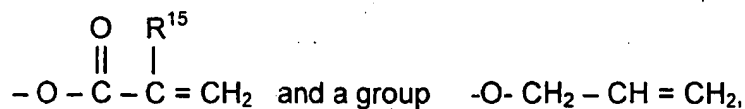


wherein Z^1 , Z^2 and Z^3 are independently selected from $\text{C}_2\text{-C}_{18}$ alkanediyl and $\text{C}_6\text{-C}_{20}$ arylene,

B^1 , B^2 and B^3 are independently selected from



wherein R^{13} is independently selected from a hydrogen atom and $-\text{CH}_3$ and $p = 0$ or an integer from 1-10, each group R^{14} is independently selected from a hydrogen atom, a group



R^{15} is a hydrogen atom or $\text{C}_1\text{-C}_{12}$ alkyl and

q , r and s independently of each other are 0 or 1,

with the proviso that in each group B¹, B² and B³ at least one R¹⁴ is not a hydrogen atom if B¹, B² and B³ all represent a group of the formula (Va), and

- (v) a solvent or solvent mixture; and
 - (vi) optionally at least one metallocene.
11. Radiation-sensitive composition according to claim 10, additionally comprising at least one further component selected from free-radical polymerizable monomers/oligomers/prepolymers that are different from component (i) of the radiation-sensitive composition, alkali-soluble binders, thermopolymerization inhibitors, dyes, plasticizers, chain transfer agents, leuco dyes, inorganic fillers and surfactants.
 12. Use of a radiation-sensitive composition as defined in claim 10 or 11 for the production of a radiation-sensitive element.
 13. Production of a radiation-sensitive element as defined in any of claims 1 to 8 comprising:
 - (a) providing an aluminum substrate which has been subjected to a pretreatment of electrochemical roughening and optionally subsequent anodizing and/or application of a hydrophilizing layer, wherein the electrochemical roughening is carried out with a hydrochloric acid electrolyte or an electrolyte essentially consisting of hydrochloric acid;
 - (b) applying a radiation-sensitive composition as defined in claim 10 or 11;
 - (c) drying; and
 - (d) optionally applying an oxygen-impermeable overcoat and drying.
 14. Printing form obtainable from the process according to claim 9.